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ABSTRACT

Stereotypic statements about social groups are correlational in nature. That is, they express the speaker's belief in the relationship between two variables, one having to do with group membership and the other being a psychological attribute. This paper describes research directed toward determining cognitive biases influencing the development of correlational concepts and their possible effects on stereotypic conceptions of social groups. Previous studies indicate that subjects overestimated the frequency with which certain types of stimulus co-occurrences had appeared in a stimulus sequence. Studies conducted by this author pursued the implications of these findings for the perception of social groups. The four experiments described focused on biases in subjects' judgment of how frequently certain kinds of information had described particular groups in a series of stimulus sequences they had just seen. Both behavioral and occupational stereotypes were examined. In all four cases subjects came away with misperceptions of the relationships among variables contained in that stimulus information. That is, some strong illusory correlations were reflected in their judgments. These experiments, then, provide strong documentation of the extent to which biases in our information processing system can influence our conceptions of social groups. (Author/GC)

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ILLUSORY CORRELATION AS A BASIS FOR SOCIAL STEREOTYPES

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Illusory Correlation as a Basis for Social Stereotypes

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It is only recently that social psychologists have begun to recognize the extent to which cognitive mechanisms can produce behavioral and judgmental reactions which have traditionally been assumed to reflect dispositional and attitudinal characteristics of the individual. Hence the notion that biases involved in the way we process information about others may, by themselves, result in and maintain the perception of differences between social groups is of relatively recent vintage, and differs considerably from traditional views of stereotyping which have emphasized the role of motivational, dynamic factors and of social learning and acculturation processes (cf. Hamilton, 1976). In this paper I will try to show that statements very much like those we typically consider to be stereotypic judgments can be the result of and can be maintained by cognitive biases in the way we process information about correlational relationships.

Stereotypic statements about social groups are correlational in nature. That is, they express the speaker's belief in the relationship or association between two variables, one having to do with group membership and the other being a psychological attribute. For example, a statement such as "blacks are lazy" does not mean that "blacks, just like everyone else, are lazy;" rather it states a relationship between "blackness" and "laziness" which by implication includes the assertion that "nonblackness" is associated with lesser degrees of laziness.

There has been surprisingly little research investigating the cognitive processes by which persons intuitively develop correlational concepts (Peterson & Beach, 1967). However, what evidence there is indicates that these processes are subject to considerable bias (e.g., Chapman & Chapman, 1967, 1969; Jenkins & Ward, 1965; Smedslund, 1963; Ward & Jenkins, 1965), probably due in part to the demands that this task imposes on our cognitive mechanisms. Consider what is involved in forming a correlational concept: it requires that the person accumulate, by accurate encoding over a period of time, the evidence regarding the frequency with which two variables have co-occurred and when one has occurred without the other; it requires that this evidence be stored over time; and it requires that the person be able to make an accurate judgment from this evidence as to the degree of association between the variables. Given the complexity of this process, and the number of such correlational relationships which might simultaneously be of interest to the person, it isn't surprising that the resulting judgments are subject to error.

The research I will describe today represents an attempt to determine some of the cognitive biases influencing the development of correlational concepts and their possible effects on stereotypic conceptions of social groups. This research is based on Chapman's (1967; Chapman & Chapman, 1967, 1969) well-known work on <u>illusory correlation</u>, which he defined as an erroneous report by an observer regarding the degree of association between two variables or classes of events. Chapman's (1967) findings indicated that subjects overestimated the frequency with which certain kinds of stimulus co-occurrences had appeared in a stimulus sequence. Specifically, if the items in a stimulus pair were <u>distinctive</u>, or if there was some <u>associative connection</u> between them, subjects overestimated the number of times they had occurred together

in the stimulus list. Our studies have pursued the implications of these findings for the perception of social groups.

The first two studies, done in collaboration with Bob Gifford (Hamilton & Gifford, 1976), focussed on the pairing of stimuli which are distinctive as a basis for establishing an illusory correlation. In this case, distinctiveness was operationalized simply as the relative infrequency of certain categories of stimulus information. In both studies, subjects read a series of sentences describing behaviors performed by members of two groups, which were simply identified as Group A and Group B. For example, the statement "John, a member of Group A, visited a sick friend in the hospital" is representative of the kind of sentences used. In both studies there were twice as many statements about members of Group A as there were about Group B; by its infrequency, then Group B became a novel or distinctive stimulus characteristic. The behaviors described in the sentences were either moderately desirable or moderately undesirable. In the first study desirable behaviors occurred much more frequently, while in the second experiment there were twice as many undesirable as desirable behaviors. Thus, in each study the relative infrequency of one type of behavior would presumably make it more salient than the other, and the two studies differed primarily in whether desirable or undesirable behavior was thereby made distinctive. However, in each experiment the ratio of desirable to undesirable behaviors was the same for both groups, and because of this, no actual relationship existed between membership in a particular group and the desirability of the behaviors describing that group. On the basis of Chapman's (1967) findings, however, we expected that subjects would overestimate the frequency with which Group B--the smaller group--had been described by the infrequently-occurring category of behavior.

To test this hypothesis, we gave subjects a list of the behavior descriptions that had been presented in the stimulus sentences, and we asked them to indicate the group membership of the person who had performed each behavior. We could then determine the extent to which subjects attributed the undesirable and desirable behaviors to the two groups, A and B. The results shown in Table 1 indicate that our hypothesis was strongly supported. The upper part of the table shows, for each experiment, the number of desirable and undesirable behaviors that described members of Groups A and B. The data obtained from the subjects are summarized in the lower part of the table. It can be seen that subjects grossly overestimated the extent to which the infrequent group--Group B--performed the "uncommon" type of behavior--the undesirable behavior in Experiment 1, desirable behavior in Experiment 2.

These results demonstrate that an illusory correlation was established, that is, subjects erroneously perceived a relationship between group membership and behavior desirability that did not exist in the information presented to them. Furthermore, this illusory correlation influenced the subjects' perceptions of the two groups, for on a variety of trait scales members of Group B were rated less favorably than members of Group A in Experiment 1, but more favorably than Group A in Experiment 2. (See Hamilton and Gifford, 1976, for a more complete presentation of these results.)

These findings would seem to have implications for stereotype formation. Majority group members usually have infrequent contact with minority group members, and certain forms of behavior, such as most undesirable behaviors, occur infrequently. These studies indicate that, even though the "uncommon"

behavior may actually be no more characteristic of one group than the other, perceiver biases may result in the misattribution of these behaviors to the minority groups with consequent differential perceptions of the two groups. Thus, a cognitive bias in the way we process information can constitute the basis for stereotyping.

Whereas these studies have demonstrated a cognitive bias resulting in stereotypic conceptions, the next two studies demonstrate a cognitive bias resulting from stereotypic conceptions. This work is based on the second cognitive basis for an illusory correlation which I mentioned earlier, namely the case in which there is an associative or meaningful connection between two stimuli. Several studies have shown that subjects tend to overestimate the frequency with which associatively-linked stimulus pairs have occurred (e.g., Chapman, 1967; Chapman & Chapman, 1967, 1969; Tversky & Kahneman, 1973). For example, in a study in which each pair in a series of word pairs was shown to subjects an equal number of times, subjects consistently estimated that pairs having an associative relationship, such as bacon-eggs, had occurred more frequently than unrelated pairs. Such associative relationships are also the basis of the well-known work of the Chapmans on illusory correlations in the use of diagnostic tests. What are the implications of this phenomenon for stereotyping?

The associative basis for an illusory correlation corresponds to the consequences of previously-learned stereotypic conceptions about social groups. The implication of the studies I have cited is that, if one has previously acquired the concept that blacks are more likely than whites to be lazy or dishonest, then the way one processes information would be biased in that direction, even in the absence of any actual difference between blacks and whites in the extent to which laziness or dishonesty is manifested in their behavior. The result for the perceiver, then, would be a subjective confirmation of his expectancy in which "blackness" is seen as being related to laziness or dishonesty, even though no such relationship might exist in the behavior the person has been exposed to.

Terry Rose and I have conducted a couple of studies investigating this process. For stimulus groups about whom subjects would have widely-shared expectations, we chose occupational groups--some primarily male occupations and some primarily female occupations. In each study the male and female occupations were used separately to construct parallel experiments within the same study, thereby providing an opportunity to determine the generalizability of the findings across different replication sets. From pretesting, we were able to identify trait adjectives that were perceived as being highly descriptive of one occupational group but not of the others. In both studies subjects read a series of sentences in which a person, identified by first name and by occupation, was described by two trait adjectives; for example, "Carol, a librarian, is attractive and serious." The studies differed in the extent to which attributes were associated with occupations in the set of stimulus sentences.

In the first study we selected, for each of three occupations, two traits that were distinctively characteristic of that group and not of the others. For example, our pretest subjects had rated the adjective "serious" as being descriptive of librarians, but not of either stewardesses or waitresses. We also selected two traits not considered highly descriptive of any of the three

groups. Thus we had eight adjectives which were used in constructing 24 stimulus sentences. In the set of 24 sentences, each of the three occupational groups was represented eight times, and each adjective occurred in conjunction with each occupation twice. So there was, in other words, a zero correlation between each adjective and each occupation.

After the subjects had read through the sentences we gave them a questionnaire booklet in which they were to indicate how many times each adjective had described a member of each group. In actuality, of course, all adjectives described each group the same number of times. We analyzed these data to see if there was any systematic bias in their judgments.

The results are shown in Table 2, where the rows represent the three occupational groups and the columns represent the grouping of adjectives according to their stereotypic association. The data are collapsed across the two traits of each type, and the values shown are the mean number of times an adjective of each type was estimated to have described a particular group. The correct answer for every cell in the table is 2. Where you see an entry underlined, it means that we predicted that that value would be the highest value in that row and that column. You can see that our predictions were supported in every case: attributes stereotypically associated with a particular group were recalled as having described that group more frequently than the other groups, and more frequently than other traits describing that group. In the statistical analyses each of these 3 x 4 interactions was highly significant.

These results are consistent with the interpretation that subjects recalled certain attribute-occupation combinations as having occurred more frequently than they actually did, due to their preexisting assumptions and expectancies about these occupational groups. In other words, subjects were finding subjective evidence for their stereotypic expectations about the groups, even though in the information they received there was no support for those expectations.

The last experiment I want to report is an extension of the study I have just described. In the stimulus materials used in the previous study, there were no actual correlations between the occupational groups and the attributes describing them. Perhaps our subjects were unwilling to recognize the possibility that no relationships existed and, feeling obliged to report some relationships, used their stereotypic preconceptions to manufacture some. Perhaps if actual correlations existed in the information available they would be sufficiently compelling that the role of stereotypic expectations would be less noticeable. To investigate this possibility, the stimulus sentences used in this experiment contained two levels of actual correlation in the stimulus information.

Subjects again read a series of sentences in which a member of an occupational group was described by two attributes. In this case, only two occupational groups were used, and each adjective occurred six times. Half of the attributes used were stereotypically associated with one or the other group, while the other half were not considered highly characteristic of either group. Cross-cutting this manipulation, half of the adjectives described only one group; for example, all six times the word "talkative" occurred it described a salesman, and never appeared in a sentence about a doctor. The other half of the words described one group four times and the other group twice. In those

cases where a word was stereotypically associated with one of the groups, it always described that group more frequently than the other group--that is, there was never a case in which, for example, the word "wealthy" described doctors twice and salesmen four times. Thus there was either a strong or a moderate degree of association or correlation between attribute and occupation, and that correlation either confirmed or was independent of stereotypic expectations.

After reading the series of sentences subjects again were asked how many times each attribute had described members of each group. They gave estimates for both groups, even if the trait had never occurred with one of the occupations. So we can look at the subjects' estimates for the group that the trait had frequently described (that is, six or four times) and for the group that the trait had infrequently or never described (that is, zero or two times). This difference will be referred to as high versus low frequency of description.

As in the previous study, parallel stimulus sets for male and female occupational groups were run as replications.

The results showed that subjects' stereotype-based expectancies again influenced their judgments of how often the attributes had described each group. Figure 1 shows the subjects' mean estimates of the number of times the attributes described each group. In each graph the left half gives the estimates for the group that the trait described less frequently--zero or two times--and the right half shows the estimates for the group described more frequently--four or six times. Not surprisingly, there is a whopping main effect associated with this difference. However, the important point is represented in the highly significant interactions evidenced in both of these graphs. Specifically, the difference between the subjects' estimates of how often a trait described the two groups was significantly greater when the trait was stereotypically characteristic of the high frequency group than when the trait was stereotypically neutral for both groups. Suppose, for example, the word "talkative," which is stereotypic for salesmen, had described salesmen four times and doctors twice in the stimulus sentences. The points connected by the solid line in the figure represent the subjects' mean frequency estimates for these two trait-occupation combinations. The dotted line shows the comparable means for neutral attributes. In terms of this example, the intersecting lines show that subjects estimated that the attribute "talkative" had described salesmen more frequently and doctors less frequently than had a neutral trait which described the two groups with the same frequencies.

Thus, we again see that stereotypic expectations have influenced subjects' judgments of how frequently various attributes characterized members of the occupational groups in the stimulus sentences. Whereas the preceding study showed that subjects will perceive a relationship between variables if it confirms a stereotype, even if no evidence is presented to support it, this study has shown that when a correlation does exist in the stimulus information, that relationship will be perceived as being stronger if it confirms a stereotype.

The four experiments I have described all focussed on biases in subjects' judgments of how frequently certain kinds of information had described particular groups in a series of stimulus sentences they had just seen. In all four cases subjects came away with misperceptions of the relationships among variables contained in that stimulus information--that is, some strong illusory correla-

tions are reflected in their judgments. As a whole, then, these experiments provide rather strong documentation of the extent to which biases in our information processing system can influence our conceptions of social groups.

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Table 1

Composition of Stimulus Sets and Attributions
of Group Membership for Experiments 1 and 2

(a) Distribution of Stimulus Sentences

Experiment 1			Experiment 2		
Behaviors	Group A	Group B	Behaviors	Group A	Group B
Desirable	18	9	Desirable	8	4
Undesirable	8	4	Undesirable	16	8

(b) Mean Attributions of Group Membership (conditional probabilities in parentheses)

Experiment 1			Experiment 2		
Behaviors	Group A	Group B	Behaviors	Group A	Group B
Desirable	17.52 (.65)	9.48 (.35)	Desirable	5.87 (.49)	6.13 (.51)
Undesirable	5.79 (.48)	6.21 (.52)	Undesirable	15.71 (.65)	8.29 (.35)

Table 2

Mean Frequency Estimates of
Occupation-Associated Traits for
Each Occupational Group

(a) Replication 1: Female Occupations

Occupational Group	Occupation-Associated Traits: librarian	stewardess	waitress	none
Librarians	2.83	2.01	2.39	2.24
Stewardesses	2.13	2.65	2.42	2.08
Waitresses	2.13	2.42	2.81	2.03

(b) Replication 2: Male Occupations

Occupational Group	Occupation-Associated Traits: accountant	doctor	salesman	none
Accountants	2.50	1.96	2.18	2.44
Doctors	2.29	2.67	2.40	2.11
Salesmen	1.75	1.82	3.07	2.58

Figure 1.

Estimated Frequency of Stereotypic and Neutral Traits as a Function of How Frequently Group Was Described by Trait